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ABSTRACT

The study was conducted to provide formulae by which College-Level Examination Program (CLEP) General Examination scores may be predicted from scores earned on the American College Test (ACT) Assessment. Five basic areas of liberal arts achievement are measured by the CLEP General Examinations: English Composition, Humanities, Mathematics, Natural Sciences, and Social Sciences and History. The ACT subtests measure similar achievement areas. The study was conducted in response to requests from students seeking prior information about their relative chances for success or passage on CLEP examinations. Formulae were developed for predicting CLEP General Examination scores from ACT Assessment data. The predicted CLEP scores, considered with standard errors of estimate, may be compared to institutional cut-off scores to determine an examinee's probability of success. This could assist an examinee in determining the advisability of investing time and money in the CLEP General Examinations. (DWH)

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Predicting Scores on the College-Level Examination Program (CLEP) General Examinations from Scores Earned on the American College Test (ACT) Assessment

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Predicting Scores on the College-Level Examination Program (CLEP) General Examinations from Scores Earned on the American College Test (ACT) Assessment

ABSTRACT

Since its inception in 1963, the College-Level Examination Program (CLEP) General Examinations have been utilized by a large number of students to earn college credit through their local institutions. However, as the costs for these examinations rise, students are increasingly seeking prior information from testing directors, advisors, counselors, and admissions officers about their relative chances for success or passage. The purpose of this study is to provide formulae by which CLEP General Examination scores may be predicted from scores earned on the American College Test (ACT).

Predicting Scores on the College-Level Examination Program (CLEP) General Examination from Scores Earned on the American College Test (ACT) Assessment

Introduction

The College-Level Examination Program (CLEP) was established by the College Board of the Educational Testing Service to enable both traditional and nontraditional students to earn college credit by examination. More than 1,800 post-secondary institutions award credit for acceptable CLEP scores.

Two types of tests are offered through CLEP: General Examinations and Subject Examinations. Only the General Examinations will be considered in this study.

> The General Examinations measure college-level achievement in five basic areas of the liberal arts: English Composition, Humanities, Mathematics, Natural Sciences, and Social Sciences and History. Each tests material usually covered in the first two years of college and often referred to as the general or liberal education requirement.
>
> Colleges and universities use various approaches to ensure a liberal education, but they expect their students to be familiar with certain common elements or areas of subject matter. The General Examinations, not developed from the viewpoint of any one approach or curriculum, sample this content (College Entrance Examinations Board, 1980, p. 5).

Examinees pay approximately $25.00 for each CLEP General Examination they take. In addition, some institutions charge a fee for recording credits earned by examination onto official transcripts. While the costs incurred by examinees attempting to earn credit via CLEP may appear high, they may represent a savings in both time and money to the examinee earning acceptable scores. Consequently, potential examinees frequently seek advise about their chances for success from counselors, advisors, testing directors, and admissions officers prior to committing their resources. It would be of great value to these individuals if they were able to predict scores on the CLEP General Examinations from data already available about the examinee.

Many post-secondary institutions require entering students to take the American College Test (ACT). This test, in addition to providing a wealth of profile information about the examinee, yields scores on four subjects (English Usage, Mathematics Usage, Social Studies Reading, and Natural Sciences Reading) as well as a Composite score (the average of the four subtest standard scores). The titles of these subtests suggest a similarity to those of the CLEP General Examinations. A summary of the number of test items, time limits, and item contents for both the ACT Assessment and the CLEP General Examinations is reported in Table 1.

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Insert Table 1 here

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The purpose of this study is to show how the scores earned on the ACT are related to and can be used to predict scores on the CLEP General Examinations.

Data

Sample

The sample in this study is comprised of 210 college freshman from a midwest regional university for whom both ACT and CLEP scores are available. All examinees took the 1978 edition of the CLEP General Examinations from October 1978 through October 1981. The means, standard deviations, and number of people in the national norm groups and the sample of this study are reported in Table 2 for both the ACT and CLEP General Examinations.

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Insert Table 2 here

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For all but two subtests of the ACT and CLEP the mean scores are higher and the standard deviations are lower for the sample than they are for the national norm groups. This apparent homogeneity of the sample may lead to the statistical phenomenon of restriction of range which may result in lower Pearson product-moment correlations than would be the case for a more heterogeneous group. Even with this potential difficulty all but four of the correlations reported in Table 3 are significant at the $p = 0.001$ level.

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Insert Table 3 here

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Prediction Formulae

Implied in the purpose of this study is that the prediction of CLEP scores from the ACT should be relatively simple and quick. Although the use of additional predictors will increase the predictive efficiency of the equations (thereby decreasing the standard error of estimate) it will, at the same time, complicate the computational process. The addition of

extra predictors will, at best, increase the predictive efficiency by ten percent and reduce the standard error of estimate by 7.0 points for the total tests and 0.5 points for subtests. Consequently, the single best predictor for each CLEP General Examination was used in the development of the prediction formulae reported in Table 4.

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Insert Table 4 here

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Prediction Examples

CLEP English Composition. According to the information provided in Table 4 the single best ACT predictor is ACT English Usage. If an examinee's ACT English Usage score is 28, the predicted score on the CLEP English Composition would be calculated in the following manner.

$Y' = 249.7 + 15.4$ ACT English Usage

$Y' = 249.7 + 15.4\ (28)$

$Y' = 249.7 + 431.2$

$Y' = 680.9$

Considering the standard error of estimate (reported in Table 4 to be 57.6 points for the CLEP English Composition) the examinee's true score would fall within the range defined by the predicted score $\pm$ 1 $SE_{estimate}$, 68% of the time. In this example the examinee's true CLEP English Composition score would fall between 623.3 and 738.5 points. The comparison of this score range with the institution's cut-off score for this test would provide an indication of the examinee's relative chance for success.

Similarly, if an examinee's ACT English Usage score is 17, the true CLEP English Composition score would lie between 453.9 and 569.1, 68% of the time.

Biological Sciences. The single best ACT predictor for the Biological Sciences subtest of the CLEP Natural Sciences examination is the ACT Composite. Using the prediction formula and the standard error of estimate reported in Table 4, an examinee having an ACT Composite score of 14 would be expected to earn a CLEP score between 30.8 and 43.8, 68% of the time.

Conclusions

In response to the purpose of this study, simple, quick and relatively accurate formulae were developed for predicting CLEP General Examination scores from ACT Assessment data. These predicted CLEP scores, considered with their respective standard errors of estimate, may be compared to institutional cut-off scores by counselors, advisors, testing directors, and admissions officers to determine an examinee's probability of success prior to the investment of time and money for the CLEP tests.

While the correlations between the ACT and CLEP scores observed in this paper were highly significant further research with a more heterogenous sample could produce even more accurate prediction formulae. Also, similar research correlating the scores earned on the Scholastic Aptitude Test (SAT) with those earned on CLEP General Examinations would provide similar computational tools for those institutions requiring the SAT instead of ACT.

References

American College Testing Program. College Student Profiles: Norms for the ACT Assessment. Iowa City, Iowa: American College Testing Program, 1980.

College Entrance Examination Board. CLEP General and Subject Examinations. Princeton, J.J.: Educational Testing Service, 1980.

College Entrance Examination Board. CLEP Scores: Interpretation and Use 1980-81. Princeton, J.J.: Educational Testing Service, 1981.

Table 1

Number of Test Items, Time Limits and Item Contents

for the ACT and CLEP Subtests

Test	# Items	Time Limit (minutes)	Item Content
CLEP			
English Composition	130	90	logical relationships within the sentence, economy, precision + clarity of communication, logical arrangement of ideas. The use of evidence, and adaptation of language to purpose and audience.
Natural Sciences			
Biological Sciences	60	45	evolution, cytology, genetics, biochemistry, bioenergetics, biosynthesis, populations, ecology, taxonomy and morphology.
Physical Sciences	60	45	chemistry, physics, astronomy, meteorology, and geology.
Mathematics			
Skills and Concepts	40	30	algebra, arithmetic, geometry and data interpretation.
Content	50	60	sets, logic, real number system, functions and their graphs, probability, statistics, etc.
Humanities			
Literature	75	45	drama, poetry, fiction, nonfiction.
Fine Arts	75	45	visual arts, music, performing arts and architecture.
Social Sciences and History			
Social Sciences	65	45	political science, sociology, social psychology, and economics.
History	60	45	United States history, western civilization and African-Asian civilization.

Table 1 (cont.)

Test	# Items	Time Limit (minutes)	Item Content
ACT			
English Usage	75	40	punctuation, grammar, sentence structure, diction and style, logic and organization.
Mathematics Usage	40	50	arithmetic, algebra, geometry, number and numeration concepts, probability, statistics, logic, etc.
Social Studies Reading	52	35	history, government, economics, sociology and anthropology, psychology.
Natural Sciences Reading	52	35	biology, chemistry, physics, physical sciences.

Table 2

A Comparison of the CLEP and ACT Scores Earned by the National Norm Groups and the Sample in this Study

TEST	National Mean	National SD	National N	Sample Mean	Sample SD	Sample N
CLEP (1978 edition)[1]						
English Composition	500	100	2,290	589	84	181
Natural Sciences-Total	462	103	883	495	82	74
Biological Science	47	11	883	47	8	74
Physical Science	48	9	883	52	9	74
Mathematics-Total	459	83	1.214	563	74	112
Skills & Concept	47	9	1,214	59	7	112
Content	45	9	1,214	55	9	112
Humanities-Total	460	85	757	469	57	73
Fine Arts	49	8	757	49	6	73
Literature	45	8	757	46	6	73
Social Sciences & History-Total	459	71	794	481	62	101
Social SCiences	48	7	794	50	6	101
History	44	7	794	46	7	101
ACT[2]						
English	18.2	5.4	45,516	22.0	4.0	210
Mathematics	17.8	7.6	45,516	22.5	6.0	210
Social Studies	17.7	7.3	45,516	22.7	5.7	210
Natural Science	21.3	6.4	45,516	25.4	4.9	210
Composite	18.9	5.8	45,516	23.2	4.2	210

[1]College Entrance Examination Board, 1981, p.12.
[2]American College Testing Program, 1980, p.13

Table 3

Pearson Product-Moment Correlations Between

ACT and CLEP General Examinations Scores

CLEP	N	ACT English Usage	ACT Mathematics Usage	ACT Social Studies Reading	ACT Social Sciences Reading	ACT Composite
English Composition	181	0.731[3]	0.387[3]	0.635[3]	0.512[3]	0.686[3]
Natural Sciences-Total	74	0.398[3]	0.520[3]	0.632[3]	0.723[3]	0.742[3]
Biological Science	74	0.308[2]	0.411[3]	0.473[3]	0.563[3]	0.579[3]
Physical SCience	74	0.394[3]	0.514[3]	0.649[3]	0.720[3]	0.738[3]
Mathematics-Total	112	0.439[3]	0.776[3]	0.378[3]	0.384[3]	0.624[3]
Skill & Concept	112	0.382[3]	0.742[3]	0.310[3]	0.359[3]	0.564[3]
Content	112	0.434[3]	0.727[3]	0.368[3]	0.359[3]	0.596[3]
Humanities-Total	73	0.483[3]	0.234[1]	0.631[3]	0.423[3]	0.562[3]
Fine Arts	73	0.459[3]	0.164	0.554[3]	0.436[3]	0.505[3]
Literature	73	0.452[3]	0.271[2]	0.620[3]	0.348[3]	0.540[3]
Social Sciences & History-Total	101	0.589[3]	0.375[3]	0.678[3]	0.601[3]	0.693[3]
Social Sciences	101	0.587[3]	0.418[3]	0.673[3]	0.600[3]	0.705[3]
History	101	0.480[3]	0.231[2]	0.551[3]	0.482[3]	0.537[3]

[1] $p \leq 0.05$

[2] $p \leq 0.01$

[3] $p \leq 0.001$

Table 4

Formulae for Predicting CLEP General Examination SCores

from ACT Scores

CLEP Test	Best ACT Predictor	N	R	R^2	Prediction Formula	Standard Error of Estimate
English Composition	English Usage	181	.731*	.534	Y'=249.7+15.4 ACT English Usage	57.6 points
Natural Sciences-Total	Composite	74	.742*	.550	Y'=156.5+14.6 ACT Composite	55.1 points
Biological Sciences	Composite	74	.579*	.335	Y'= 21.9+ 1.1 ACT Composite	6.5 points
Physical Sciences	Composite	74	.738*	.545	Y'= 16.2+ 1.6 ACT Composite	6.0 points
Mathematics-Total	Math Usage	112	.776*	.602	Y'=346.7+ 9.6 ACT Math Usage	47.0 points
Skills & Concepts	Math Usage	112	.742*	.550	Y'= 38.5+ 0.9 ACT Math Usage	5.0 points
Content	Math Usage	112	.727*	.529	Y'= 31.8+ 1.1 ACT Math Usage	6.0 points
Social Sciences and History-Total	Composite	101	.693*	.481	Y'=241.7+10.3 ACT Composite	44.7 points
Social Sciences	Composite	101	.705*	.497	Y'= 26.3+ 1.0 ACT Composite	4.3 points
History	Social Studies	101	.551*	.303	Y'= 31.3+ 0.7 ACT Soc. Studies	5.8 points
Humanities-Total	Social Studies	73	.631*	.398	Y'=326.2+ 6.3 ACT Soc. Studies	44.7 points
Fine Arts	Social Studies	73	.554*	.307	Y'= 36.9+ 0.5 ACT Soc. Studies	4.8 points
Literature	Social Studies	73	.620*	.385	Y'= 32.8+ 0.6 ACT Soc. Studies	4.4 points

*$P \leq 0.001$